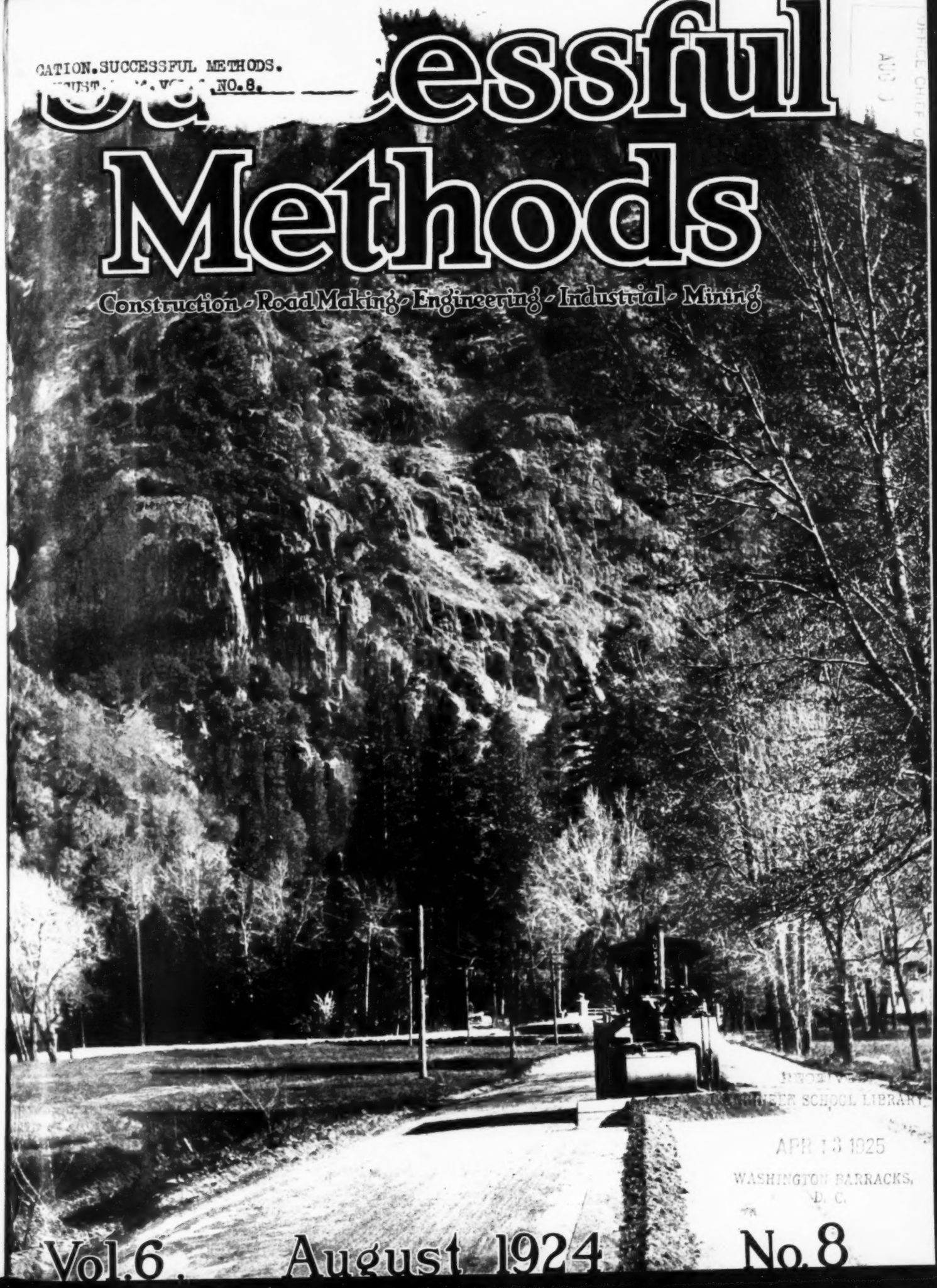
CATION. SUCCESSFUL METHODS.
NO. 8.

Successful Methods

Construction - Road Making - Engineering - Industrial - Mining



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Vol. 6. August 1924 No. 8

"I cannot speak too highly of the LEROI"

NOTE

It is generally conceded that most mixers are underpowered. Every 4S mixer requires a LE ROI 4 H. P. Engine and every 7S mixer requires a LE ROI 8 H. P. Engine for a maximum of results at the lowest cost. If you are not using these engines ask us to prove why it will be to your decided advantage to do so. Use your letterhead, please.

Lansing, Mich.
February 6, 1924.

Mr. W. R. Karll,
LeRoi Motor Co.,
Mitchell & 60th Aves.,
Milwaukee, Wis.

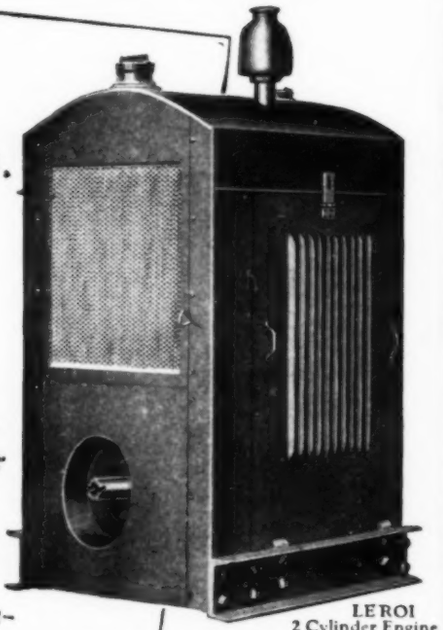
Gentlemen:-

Yours received in regard to the mixer. Will say it is now being overhauled ready for Spring work.

I am sending under separate cover a picture which I trust you will return. When building my mixer I found it would be necessary to have a very light and flexible power unit without sacrificing the horse power. I was advised to try the LeRoi engine. I used a Lansing 7 S 10-foot mixer, mounted on a speed wagon chassis I selected the LeRoi two-cylinder engine because it was light, - had the least vibration of any engine of equal power. My record of five months working season of 1923 is proof that the LeRoi filled the bill in every respect, 125000 square ft of sidewalk, 50000 lineal feet of curb and gutter. I have had ten years experience with gasoline engines, and I cannot speak too highly of the LeRoi.

Yours truly,

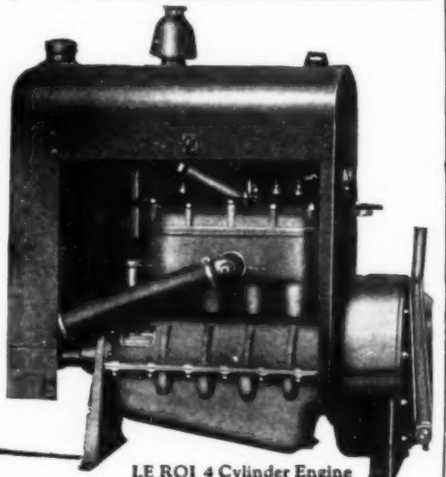
Geo. W. Leavens



LEROI
2 Cylinder Engine

LE ROI Power Service

HOPPER COOLED TYPE — 3 to 4 H. P. Single Cylinder - 5 to 8 H. P. Two Cylinder.
RADIATOR COOLED TYPE — 5 to 8 H. P. Two Cylinder - 10 to 15 H. P. Four Cylinder.



LE ROI 4 Cylinder Engine

There is no better recommendation for an engine than the unbiased testimonal of a user.

LE ROI COMPANY, *Milwaukee, U. S. A.*

LEROI ENGINES

for dependable power!

Successful Methods

A Magazine of Construction Service

Published by SUCCESSFUL METHODS, Inc.
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Vol. 6 AUGUST, 1924 No. 8

Twelve Months in the Year

LAST winter saw more outdoor construction work than any previous year. No definite figures are available, but in the industrial northern States it seems safe to say that the work that was pushed right through cold weather was in excess of one-fifth of the year's total. This coming winter it appears likely that the proportion will be somewhat higher.

The construction industry thus is slowly learning that shutdowns for the winter are costly. It also is becoming more generally known that the extra expense of handling many kinds of work in cold weather is not so great. In fact, under the conditions that have existed in the building industry during the last two or three years various operations have cost just as much in the summer as in the winter. This situation will probably not change soon. There is also the added factor of earlier completion which in many cases outweighs all the disadvantages of winter work.

Concerns who have had experience in winter construction operations have learned that preparations must be made in advance to meet problems that do not exist or are not serious in mild weather. For example, delivery of materials is likely to be interrupted occasionally during severe winters. Building work and concreting operations also have to be enclosed or specially protected.

All these and the other special problems that arise have been economically solved by many concerns. There is no longer any more question about the practicability of handling construction work in the winter than there is about running an automobile in cold weather. The concerns who have made good at it know. They are going ahead now with their preparations to keep their unfinished jobs going next winter. They will not hesitate to start new work at any time.

A Major Highway Problem

THE lack of proper maintenance of the vast mileage of roads outside of the Federal and State systems is one of the major highway problems of the country. The money required to do a good job is spent by various local bodies in many States. Only a very limited number of localities have, however, learned how to get fair value for their money, and fewer yet keep their local roads in good condition.

Not many realize what this whole situation involves. In the first place, it has to do with close to 80 per cent of the highways of the country. On these local highways, which almost all have unimproved surfacing, live a surprisingly large percentage of the total population. The State systems of improved roads are of little or no value to the people so situated when the local roads are impassable. Moreover, much of the hauling of farm products is done entirely over local roads. There is no prospect now that more than a very small percentage of these local roads in the chief agricultural States can be surfaced. The outlook is not much better in any other States, except where industrial districts exist. Better maintenance methods therefore offer the only means of obtaining more serviceable local roads.

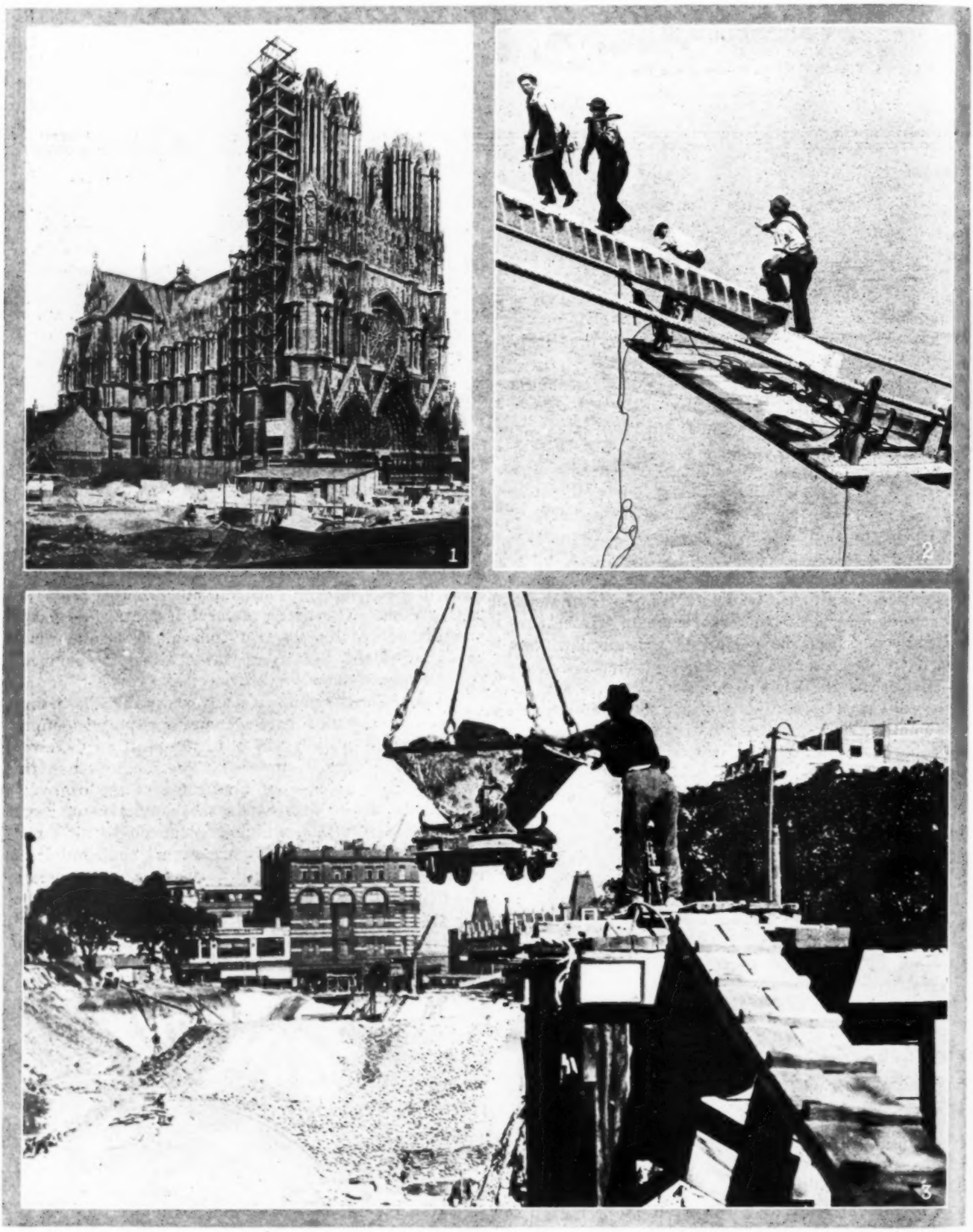
Just how local officials, who change frequently and who rarely really know anything about road work, can be brought to do good maintenance work remains to be demonstrated. The money they have to spend is sufficient in many localities to do a much better job than is now done. The needs of local traffic are so great and are increasing so fast that much larger sums could be raised with comparative ease, if the local officials would show results.

The excellent maintenance work which is being done on most of the State systems is having its effect on many local officials. Most of the State roads, however, have improved surfaces. The methods used in keeping them up are not applicable to the ordinary dirt road. There also exists the conviction of most of the local officials, which is common to all rural male Americans, that they are expert road builders. Hence, it seems that it will be necessary to educate the officials unbeknown to them. At the same time the creation of powerful demands from local road users for better maintenance should produce the desired effect.

Successful Methods Is Free

THIS magazine is sent free of charge each month to 40,000 men engaged in various kinds of construction work. It is read by contractors, engineers, public officials and others identified in various ways with construction. Every name on the mailing list is carefully classified and those who do not receive the magazine and who desire to get it each month should be sure to state their business as well as their exact address when they write asking that their names be put on the mailing list.

Church, Bridge, Subway



1. Reconstructing the Rheims Cathedral damaged during the war by German shells. © *International.*
2. Building a temporary footway on the Delaware River bridge between Camden and Philadelphia. © *International.*
3. Sydney, Australia, is building a subway. This shows the work on the Hyde Park station. © *International.*

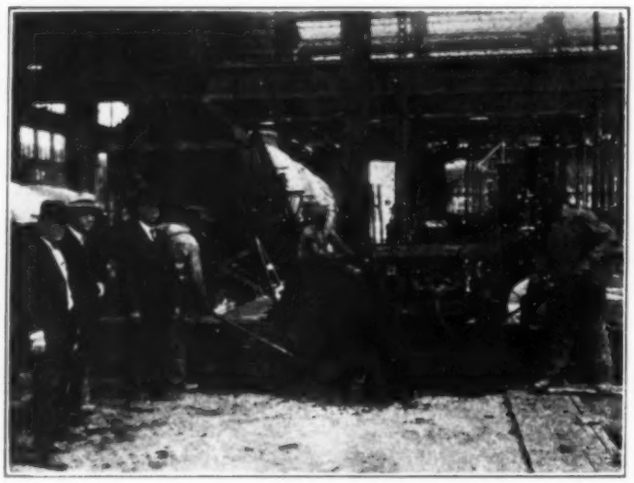
Soldier, Archbishop, Ditch

4. The officer who set off the biggest blast in France since the war. Ten tons of surplus explosives went up at once and the explosion was made the occasion of a number of scientific tests. © *P. & A. Photos.*
5. The Archbishop of Canterbury in a role similar to that of the French officer at the left. He exploded the first charge in a new coal mine in Kent and seemed to enjoy his unusual job. © *International.*
6. Draining the Florida Everglades. © *Ewing Galloway.*

A HANDY MACHINE IN AN UNHANDY PLACE

Small Roller Compacts New Asphalt Floor in Southern Pacific Locomotive Erecting Shops at El Paso

ROLLING asphalt is not usually ranked as an indoor job, but the two photographs on this page show a small roller hard at work in the locomotive erecting shops of the Southern Pacific Railroad at El Paso, Texas. A new floor was needed in the shops, and it was decided to use rock asphalt. The small roller was owned by the asphalt company, and it was brought in to handle this job, where an ordinary size roller would have been very much in the way and extremely hard to handle.

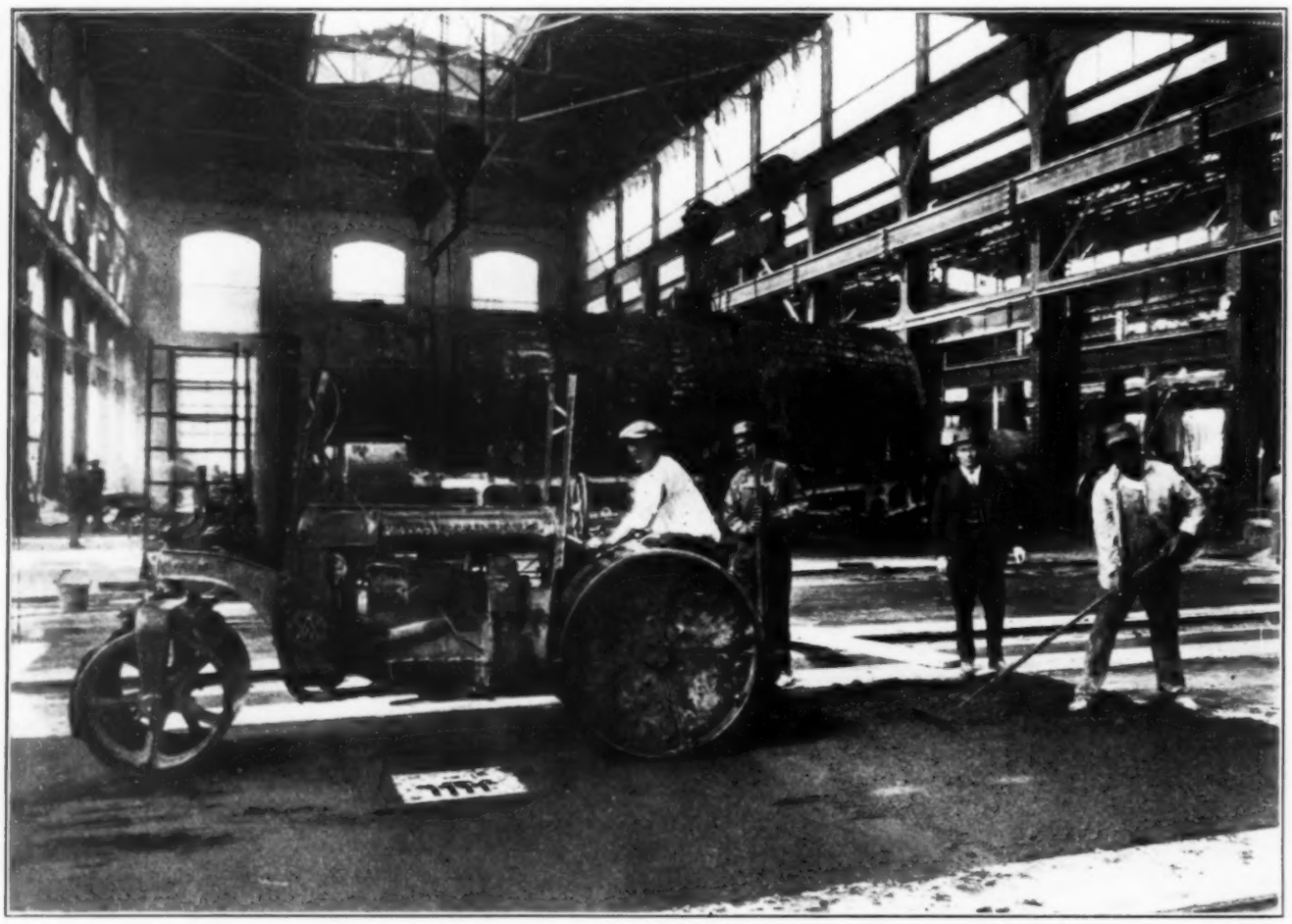


AMONG THE STEEL COLUMNS

The upper photograph shows the conditions under which the roller had to work. Although the main part of the building was free from columns, there were other sections where the asphalt had to be laid in which the steel columns were fairly close together. The roller handled the work in these sections with the same ease with which it was operated in the more open parts of the building.

The lower photograph gives a good illustration of comparative sizes, with the small roller in the foreground and the immense locomotive boiler in the background.

This indoor work by a small roller is a good example of the way in which a handy machine of that size may be used profitably under unusual conditions. An ordinary size roller would have been too unwieldy for this particular job.



ROLLING ONE SECTION OF THE NEW ASPHALT FLOOR

HOG TROUGH BRIDGES

Missouri County Engineer Designs Structures Which Can Be Replaced After Floods for About $50 Apiece

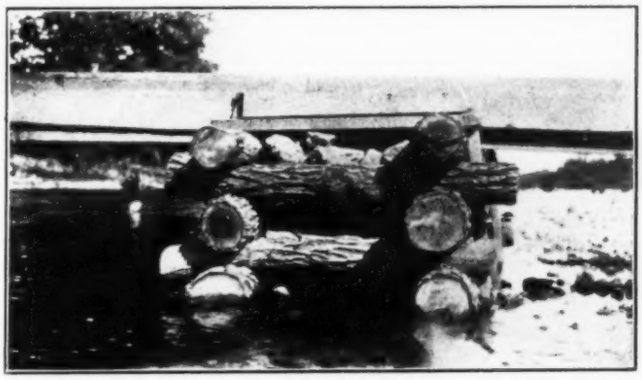
By John H. Long
Division Engineer, Missouri State Highway Commission

ONE of the State routes in Missouri runs through Reynolds County and between Centerville and the Iron County line crosses three forks of the Black River.

HOG TROUGH BRIDGE

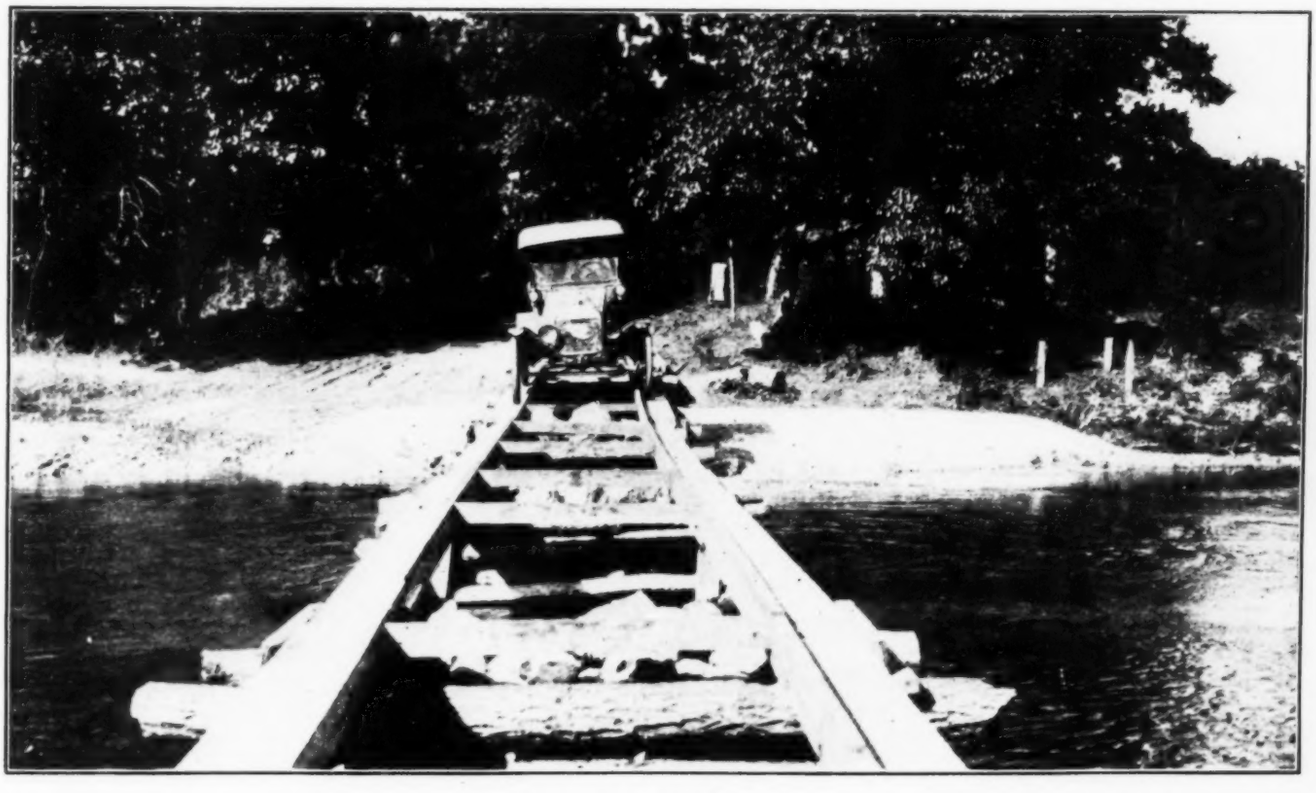
As shown by the accompanying photographs, these streams are of fair size and the crossings are not only hampered by deep water, but by large sized loose gravel which practically makes fording impossible. During the summer months there is considerable traffic over this route, as Reynolds County is situated in the heart of the Ozarks and is a mecca for tourists and campers who like fresh water streams, springs and hills.

Due to lack of available funds at the present time the State Highway Commission has been unable to finance the construction of improvements over Middle and East Forks of Black River. But traffic must be carried across these streams and the county superintendent of maintenance, E. W. Scott, conceived the novel idea of constructing low water, or, as locally designated, "hog trough" timber bridges.



DETAIL OF CRIB PIER

These structures consist of a series of crib piers



ONE OF THE BRIDGES IN USE

spaced from 16 to 20 ft. apart, center to center, upon which is built and fastened a runway designed to hold and carry no weight greater than small trucks or large touring cars.

As shown in one of the photographs, these crib piers consist of timbers 6 to 8 in. in diameter, notched on two sides near the ends in order to secure flat bearing surface upon the timber above and below and stability of pier itself. The piers are constructed by building up a 4 by 6 ft. crib, with the longer dimension normal to center line of roadway. These timbers are spiked together and additional stability is secured by spiking vertical 2 by 4 strips to each timber throughout height of crib.

In order to prevent scour as much as possible, shallow excavations (very difficult to make without use of sheet piling) are made in the loose gravel of the stream bed, and the first pier placed therein. The cribs are filled with 6 and 8 in. stones as ballast, with interstices filled with spalls.

The superstructure of this bridge consists of a track or runway with the two lines spaced no less than 4 ft. from inside to inside of wheel guard. Each line of track consists of two 6 by 10 in. oak planks, built in the form of an L, with the vertical stem inside to act as a wheel guard. These planks are from 16 to 20 ft. in length, made to conform with spacing of piers; joints are broken over the center of each pier and are spliced with 2 by 6 in. splice plates about 4 ft. long. The inside of the wheel guards is also spiked to the piers by means of plates before the cribs are filled with stones to keep them in place.

The alignment of the runway is maintained by the use of spacers placed 6 ft. apart throughout length of bridge. These spacers are 2 by 4 in., 4 ft. long.

As the runway is about 2 ft. above low water stage, it is subject to damage during rises and in many cases has been entirely destroyed and then replaced. It generally fails by the superstructure being washed away and the crib piers undermined. However, materials for its construction are obtained cheap, locally. Timber for cribs is cut from the nearby bank and stone is obtained from the stream bed. When not salvaged from a nearby drift pile, timbers for runway are obtained for a nominal figure from some neighboring sawmill. Labor is generally the only expense. These bridges have been replaced several times this year at a cost no greater than $50 after each flood.

Since the photographs were taken, some improvements have been made in the construction of these structures. A "V" guard is constructed at each end as an approach and the cribs are being fastened by means of cables to dead men planted upstream. The superstructure is wired to some nearby tree, which sometimes results in its salvage after floods.

These bridges are rather dubious looking when encountered by the uninitiated, but are giving good service to the traveling public and causing favorable comments on the activities of Mr. Scott and the State Highway Commission. Service is more important than looks.

UNIVERSITY OF MICHIGAN OFFERS FELLOWSHIPS IN HIGHWAY ENGINEERING AND TRANSPORT

THE Board of Regents of the University of Michigan will award the following Fellowships not later than Nov. 1, 1924. Two Fellowships may be awarded about Sept. 10 to men who intend to be in residence during the first semester.

The Roy D. Chapin Fellowship in Highway Transport, which is offered to provide for the investigation of an approved subject relative to highway transport.

The Roy D. Chapin Fellowship in Highway Engineering, which is offered to provide for the investigation of an approved subject relative to hard-surfaced roads and pavements.

Two Detroit Edison Fellowships in Highway Engineering, which are offered to provide for the investigation of approved subjects relative to moderate-cost country roads.

General conditions: Each Fellowship pays the sum of $250, with an allowance of $50 for expenses. Fellows do not have to pay tuition fees. A Fellow must hold a Bachelor's Degree from a college of recognized standing. He must enroll as a graduate student in highway engineering or highway transport, and as a candidate for the degree of Master of Science or Master of Science in Engineering. He must be in residence for one of the following periods: First Semester (October to February), Winter Period (December to March), Second Semester (February to June). An application for a Fellowship must include a concise statement of the candidate's educational training and engineering experience, and three references.

During the months of December, 1924, to March, 1925, inclusive, the University of Michigan will offer nineteen professional Short Period Courses in Highway Engineering and Highway Transport. Each course will consist of thirty lectures, will be given in a period of two weeks and will count as two hours' credit toward the total of twenty-four hours required for the Master's Degree.

Applications for Fellowships should be sent to Professor Arthur H. Blanchard, 1026 East Engineering Building, University of Michigan, Ann Arbor, Mich.

NEW JERSEY ISSUES NEW ROAD MAP

THE New Jersey State Highway Commission has just issued a new road map which it is distributing among those who use the highways of that State. This map is printed on tough paper which does not tear easily and on the reverse side contains a summary of the main routes, a list of the colors used to denote the directions of the different routes and also some photographs showing typical signs, such as direction signs, caution signs, etc. All State highways are marked on the map in red.

CRANE GETS OUT TWELVE-TON LOG

Hauls It Up Steep Slope and Then Returns to Its Regular Job

AS a condition of being permitted to put up a high line the Dayton Power & Light Company of Dayton, Ohio, agreed to put all timber, which it was necessary to cut, in such a position that the owners could remove it easily. This looked like a very simple promise until some big trees were felled in the bottom of a hollow and the company found itself with some 10 or 12-ton logs on its hands in a place from which it was no easy task to remove them.

LOG IN BOTTOM OF RAVINE

The log shown in the photograph weighed 12 tons and all efforts to remove it were unsuccessful until a gasoline crane mounted on a 5-ton truck was put on the job. This crane, which was purchased by the Dayton Power & Light Company for the purpose of digging trenches in another section of the city, went to the place where the log was under its own power. It is equipped with dragline drums and a line was run down the 45-degree slope and attached to the log. The motor was then started and the big piece of timber was hauled up to solid ground without difficulty.

Altogether the crane dragged these logs about ¼ of a mile and then went back to its regular work of trench digging.

This trench - digging work is being done by the crane at the rate of about 167 ft. of trench per day. The trench is 6 ft. in depth and 36 in. wide, and the crane is doing the digging, using a ½-yd. dragline bucket.

Its mobility makes it an exceedingly serviceable tool for this sort of work. It can proceed along the trench as it digs, and its motor truck mounting makes it possible to leave its regular work and do an odd job of the sort described on this page without undue loss of time. It travels from one job to another at motor truck speed, and can be taken home and put in the garage at night instead of being left on the job with a watchman to see that nothing goes wrong.

It can be used at any point along the trench and can reach any point where its services are needed in almost as little time as it takes to tell about it. This, of course, greatly increases its efficiency and makes it available for a good many phases of the work in which a more cumbersome machine would be useless.

THE SAME LOG AFTER THE CRANE HAD DRAGGED IT UP THE STEEP BANK

ELIMINATING GRADE CROSSINGS

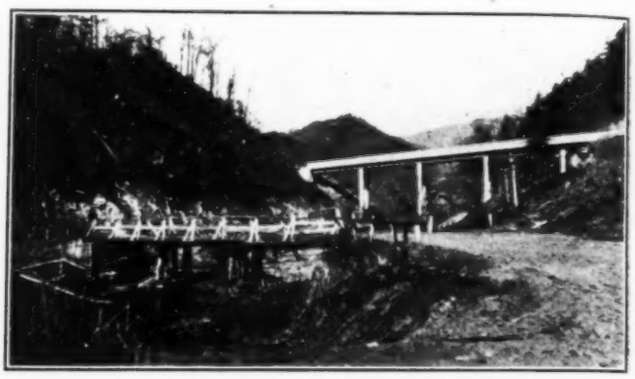
North Carolina Is Using Various Types of Construction in This Important Work

THE elimination of railway grade crossings is an important problem in every State in the Union. All of the various State highway departments are doing what they can to get rid of these danger spots in their highway systems.

ONE OF THE DANGER SPOTS THAT IS NO MORE

North Carolina, under the leadership of Frank Page, State highway commissioner, and C. M. Upham, chief engineer of the department, is pursuing a progressive policy in this matter. In the last year or two more than 300 grade crossings have been eliminated from the State highway system, and at the present time plans are being made for the elimination of some of the crossings which remain.

Three methods are used to get rid of the dangerous grade crossings. A great many of them have been eliminated by the realignment and relocation of roads. It is the settled policy of the commission not to cross a railroad either above or below or on the grade where an available location can be found continuously on one side. The practical value of this policy is evidenced by the fact that in most instances a mile of hard surfaced road can be built for the cost



THIS CONCRETE BRIDGE CROSSES STREAM AND RAILROAD

DANGEROUS GRADE CROSSING ELIMINATED BY BRIDGE SHOWN ON OPPOSITE PAGE. NOTE THE SMOKE FROM APPROACHING TRAIN AT THE LEFT

of one overhead bridge.

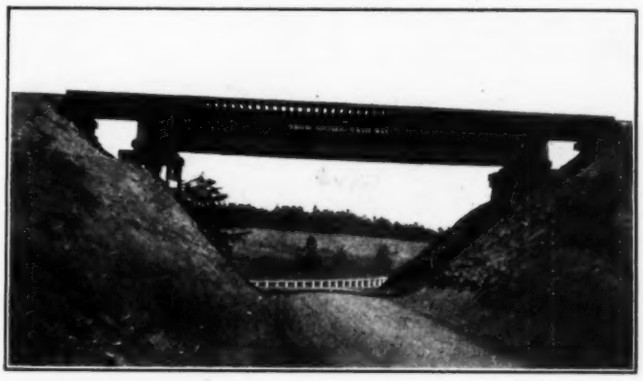
The photographs which accompany this article show several of the different types of structures which have been built in various parts of North Carolina to carry the highway over or under the railroads. Half of the cost of this grade-crossing elimination has been paid by the railroad and the remainder by the State Highway Commission.

THE CROSS SHOWS WHERE THE HIGHWAY FORMERLY CROSSED THE TRACKS

The bridge in the small photograph at the right on page 8 is a good example of one type which is being built by the department. It is a five-deck, reinforced concrete girder span and crosses both the railroad and Mill Creek between Old Fork and Ridge Crest. In the foreground may be seen the old bridge which carried the highway across the creek. The photograph at the left shows a grade crossing eliminated by the construction of this particular bridge.

Two types of wooden overhead bridges are shown

WOODEN BRIDGE CARRYING HIGHWAY OVER RAILROAD



STEEL BRIDGE CARRYING RAILWAY OVER HIGHWAY

THIS BRIDGE NOW CARRIES THE RAILWAY OVER THE HIGHWAY AND REMEDIES THE DANGEROUS CONDITION SHOWN ON THE OPPOSITE PAGE

CONCRETE SURFACED HIGHWAY CROSSING OVER RAILWAY ON CONCRETE BRIDGE

on page 9. These wooden bridges are proving satisfactory. The other photographs show the types of underpass construction where the highway is carried under the railroad. The small photograph at the right of page 9 shows a steel girder supported by concrete abutments.

The two photographs on page 10 show two views of a concrete bridge which carries the highway under the Southern Railway in Burke County. This type of construction is proving extremely serviceable and makes a bridge that has its appearance as well as its utility to recommend it. North Carolina is saving thousands of dollars by this expenditure of money for increasing the safety of the highways.

THE NEW CONCRETE BRIDGE

KEEPING A RIVER IN ITS PLACE

Willow Mattresses and Mud Cells Curb Ravages of Missouri

UNLOADING BRUSH FOR MATTRESSES

THE Missouri River when on a rampage carries destruction. In the last days of winter great cakes of ice come down in the current and do great damage to the railroad embankments. Later, when the spring freshets raise the river to flood stage, there is even greater danger that the river banks may be washed away.

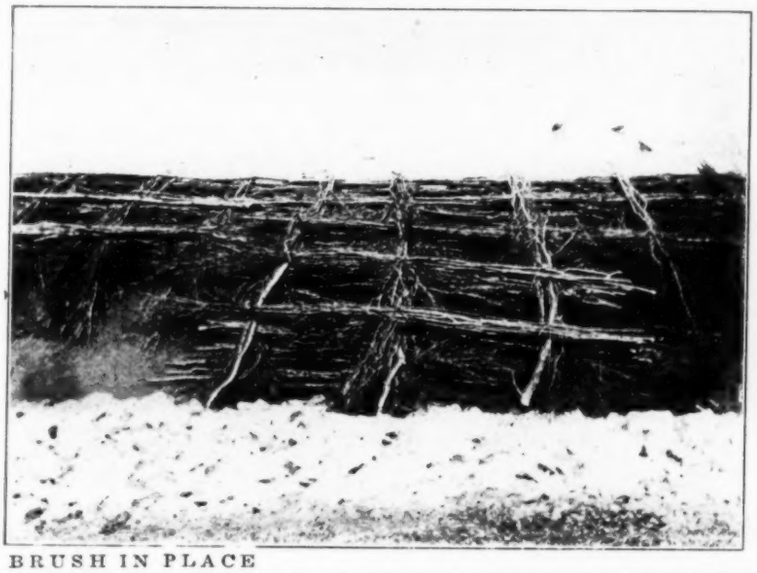
At Dover, Missouri, about 50 miles below Kansas City, the Missouri Pacific Railway is making successful use of brush mattress and mud-cell revetment to protect railway embankments. Winter erosion caused a long strip of bank to settle and made it necessary to suspend train operation until a cinder fill could be made. The engineers found that they had to stabilize a river bank that was steadily moving down into the current, which at once carried away the material. Furthermore, the river bed along this stretch is unstable.

It was decided to place what is known as the loose fascine type of willow mattress along the foot of this bank. To build this type of mattress, long poles are placed parallel to the bank and spaced 8 ft. apart. Rolls, or fascines, of willow brush are bound securely at right angles to the poles, being fastened with small "sewing cables." Anchor cables are run up the bank in trenches and attached to deadmen placed 4 ft. underground. Work on such a mattress is begun at the upper end of the stretch to be protected and continued down stream. After such a mattress has been completed, rip-rap stone is used to sink it.

On top of this substantial mattress, mud cells were started. These are pole cribs 6 ft. square, and are intended to catch the mud and hold it. As a further precaution it was decided to cover the mud cell work with a fender mattress. These mud cells called for considerable work as in many places they were carried to a height of as much as 25 ft. above the river bed.

If this work is properly done, it does not take long until the silt and sand begin to fill the cribs, and soon a very helpful growth of small willow springs out to do its part in halting the destructive work of the elements. The Massman Construction Co., Kansas City, Mo., had the contract for this job.

Flood work of this sort is necessary at a great many points along the Missouri, and various methods of solving the problem are being tried out. These willow mattresses thus far have done their work successfully.



BRUSH IN PLACE FORMING MUD CELLS

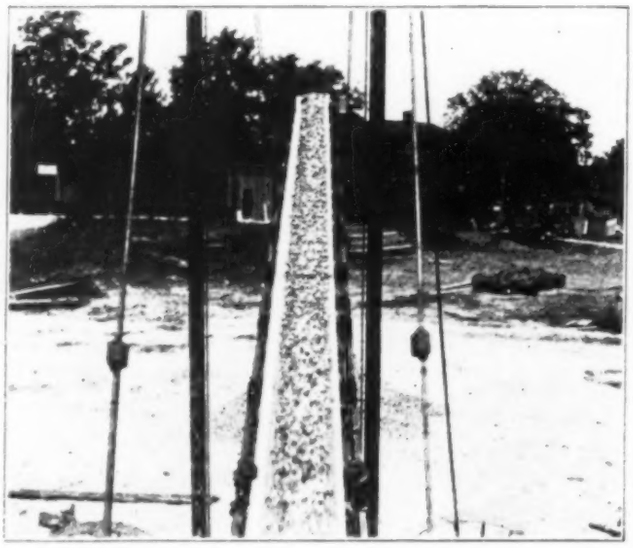
MATTRESSES AT A POINT WHERE RIVER FORMERLY DID GREAT DAMAGE

UNLOADING CARS WITH CONVEYORS

Kentucky Highway Department Operates Efficient Material Yard at Shelbyville—Bucket Loader Is Part of Plant

THE State Highway Department of Kentucky is operating a material yard at Shelbyville with two portable conveyors and a bucket loader. Bottom dump cars bring the mateal, consisting of broken stone and screenings, and are spotted over a track hopper which discharges directly into the conveyor hoppers.

The lower photograph on this page shows the two conveyors at work, one of them making a storage pile and the other loading directly into a motor truck. Both plans are used in order that the unloading of the cars may be carried on continuously without waiting for the arrival of motor trucks.



CONVEYOR UNLOADING STONE FROM CAR TO STORAGE PILE

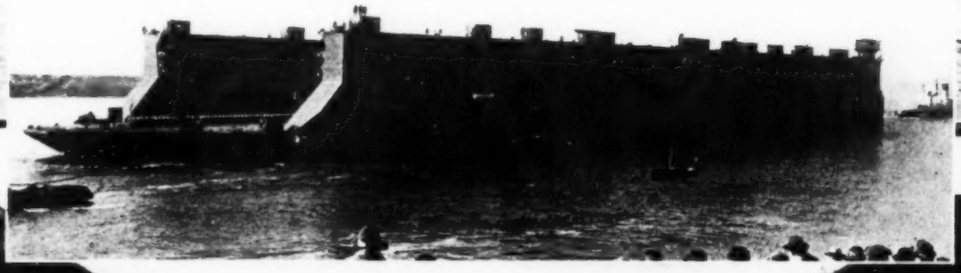
As may be seen in the photograph, the wheels on the conveyors are set so that the conveyors may be moved radially to handle different classes of material. Each conveyor is operated by one man.

The bucket loader moves from one storage pile to another, loading the trucks as they come in. These are 3½-ton trucks and are loaded in about three minutes. Sixteen of them are used in this particular yard.

The cost of unloading the stone from the flat cars to the trucks or storage pile averages about 1½ cents per cubic yard and it takes about 40 minutes for one of the conveyors to unload a car.

TWO CONVEYORS AND BUCKET LOADER AT WORK SIMULTANEOUSLY

Britain's Big Dry Dock



The upper photograph shows the floating dock with the Aquitania in the background, which gives a good idea of its size. © *International.*

The middle photograph shows the big dock being hauled down the Tyne at the start of its trip to Southampton. Ten tugs were necessary to take it down the river. © *P. & A. Photos.*

The lower photograph shows an interior view of the dock, which is 960 ft. long and has an overall width of 170 ft. © *International.*

PORTABLE PLANT POURS CONCRETE FOR BIG STADIUM

AN unusually efficient portable mixing and chuting plant is being used by the James Leck Company of Minneapolis in the construction of the new stadium for the University of Minnesota. This mixing plant is shown in the two photographs on this page and is used for pouring the concrete in the main structure. A smaller plant of a much similar design poured the footings.

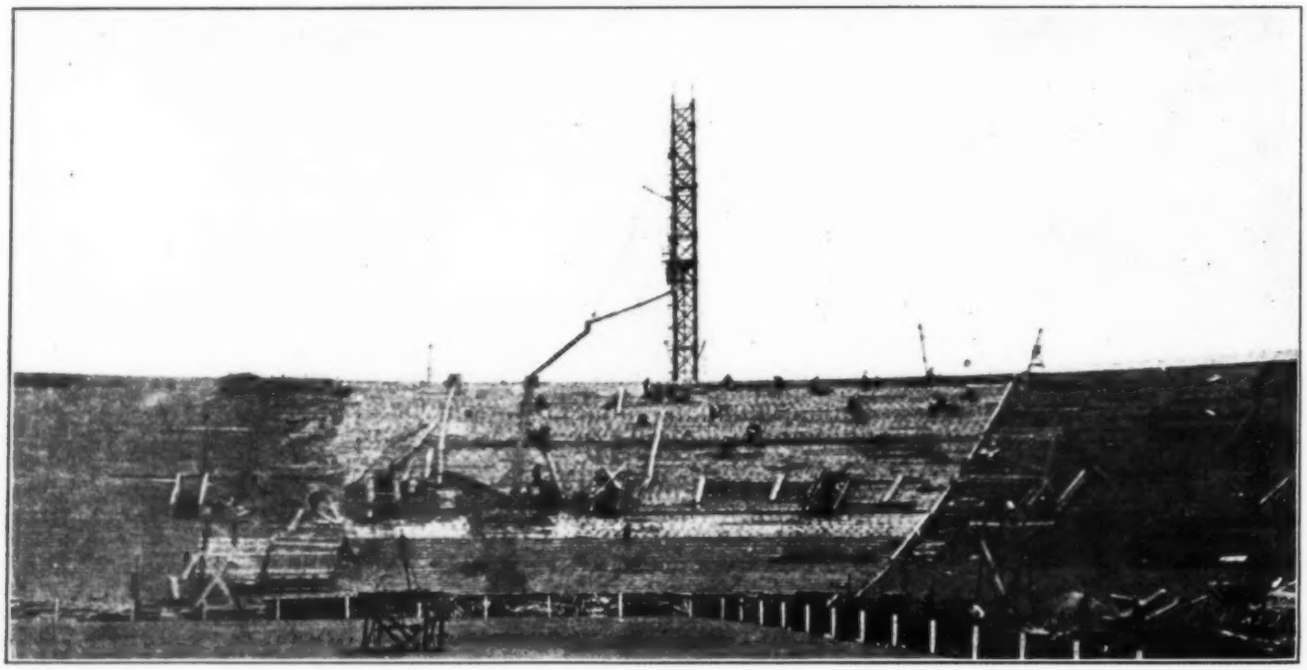
The plant shown in the photographs moves on heavy timber track which is laid close to the outside of the big horseshoe. The tower, mixer and material bins are all set on a strong supporting frame, which moves on this track. About half way up the tower may be seen a self-supporting boom chute with an 80-ft. radius and it is so balanced that the only guying necessary is to the top section of the tower while concrete is being poured. The guy ropes may be seen in the upper photograph.

The concrete is delivered from the chute into wooden troughs of light construction so that the material may be quickly shifted from one to the other. It takes only a minute or so to switch the troughs so that the concrete may be diverted to different parts of the form without moving the chute line.

The lower photograph shows concrete being poured through a section of this light wooden chute and other sections of the chute may be seen at other points on the forms.

The development of portable mixing and chuting plants has not yet been standardized, and the performances of equipment such as that described on this page furnish valuable data for contractors engaged in similar jobs elsewhere.

As may be seen from the photographs, this plant is handling a big job and is doing its work successfully. It is an excellent example of how a contractor solves the problems which are put up to him by the various jobs which he undertakes, each one of which usually has its own peculiarities.



TWO VIEWS OF PORTABLE MIXING AND CHUTING PLANT AT WORK ON NEW MINNESOTA STADIUM

CLEARING THE WAY FOR CONSTRUCTION WORK WITH DYNAMITE

DYNAMITE was recently employed to good advantage in clearing a tract of 100 acres which is being opened up for the purpose of building homes at North Woodbury, N. J. The tract was entirely covered with a heavy growth of trees and stumps. One man worked about two and one-half months doing the blasting; another carted the stumps away to piles to be burned.

About 4000 lb. of explosives were used. At present only through and cross streets are cleared and graded. There still remains considerable clearing to be done before building operations begin, and this will be done with dynamite. It would have taken a large force of men to grub out the stumps removed by this one man with dynamite, and the expense would have been very much greater.

The work was done by Charles H. Fish, a professional blaster of Paulsboro, N. J. The tract is being developed by Mahlon W. Newton of Philadelphia and associates.

GALVESTON IS EXTENDING ITS GREAT SEA WALL

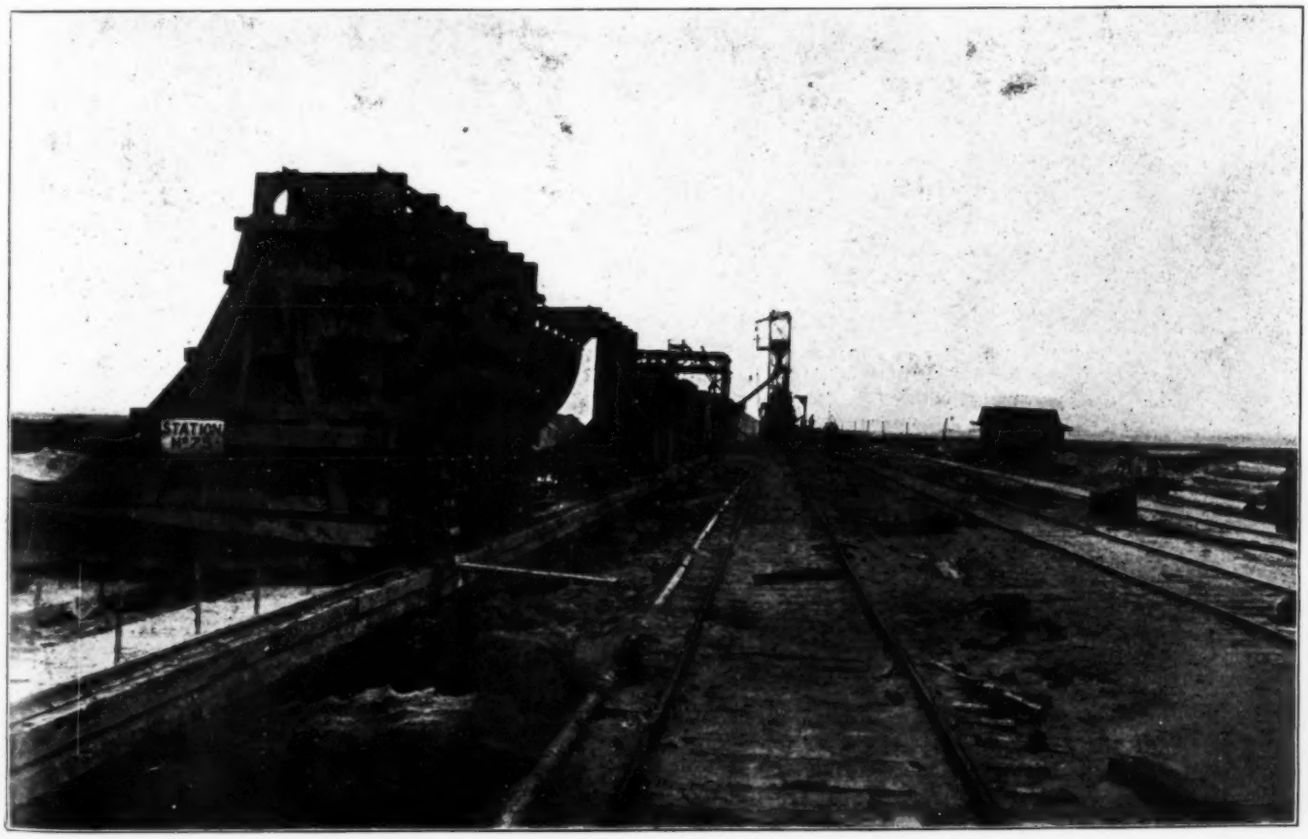
Concrete Structure Will Make Whole City Safe from Storms

THE great seawall that is being constructed at Galveston, Texas, will remove the menace of the Gulf of Mexico, it is confidently believed by the Government engineers. The great disaster of September, 1900, showed the power of the sea. The storm reached hurricane proportions and when the wreckage had been cleared away it was found that the sea had exacted a toll of more than 6,000 lives.

Since then various sections of seawall have been built through the cooperation of the county and the Government. In September, 1919, another hurricane swept down upon Galveston, producing a high tide that scoured a hole about 2000 ft. wide at the rear of the foundation work. To fill in this scoured portion, material had to be brought through a pipe line nearly 2 miles long.

This hurricane did not do any damage to any part of the completed wall, but it did great damage to two of the steel forms that were in position empty. One of them had the front curved face badly smashed in. The other form was torn loose from its anchorage and carried away into deep water about 80 ft. from its original position, being damaged beyond repair.

It is to cope with these mighty forces that the new sea wall is being made of substantial concrete, with a curve on the seaward side that will make the onrushing waves leap straight upward and dissipate their strength on its unyielding surface.

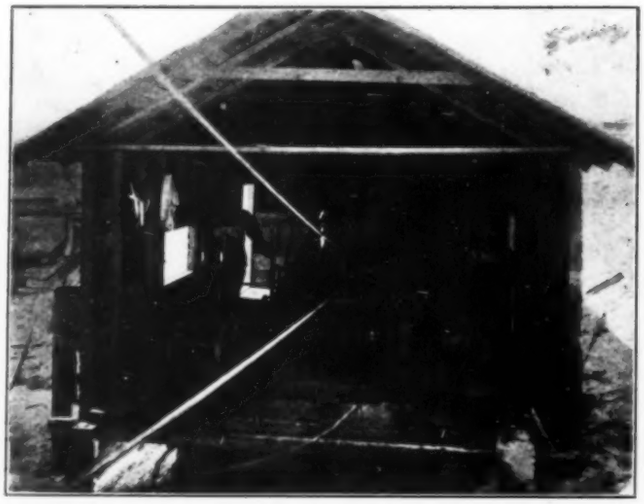


MOVABLE MIXING PLANT AT WORK ON GALVESTON SEA WALL. CURVED STEEL FORMS ARE USED

GETTING OUT SILICA SAND

Three-Drum Hoist with 1¾-Yard Bucket Produce Forty Carloads a Day

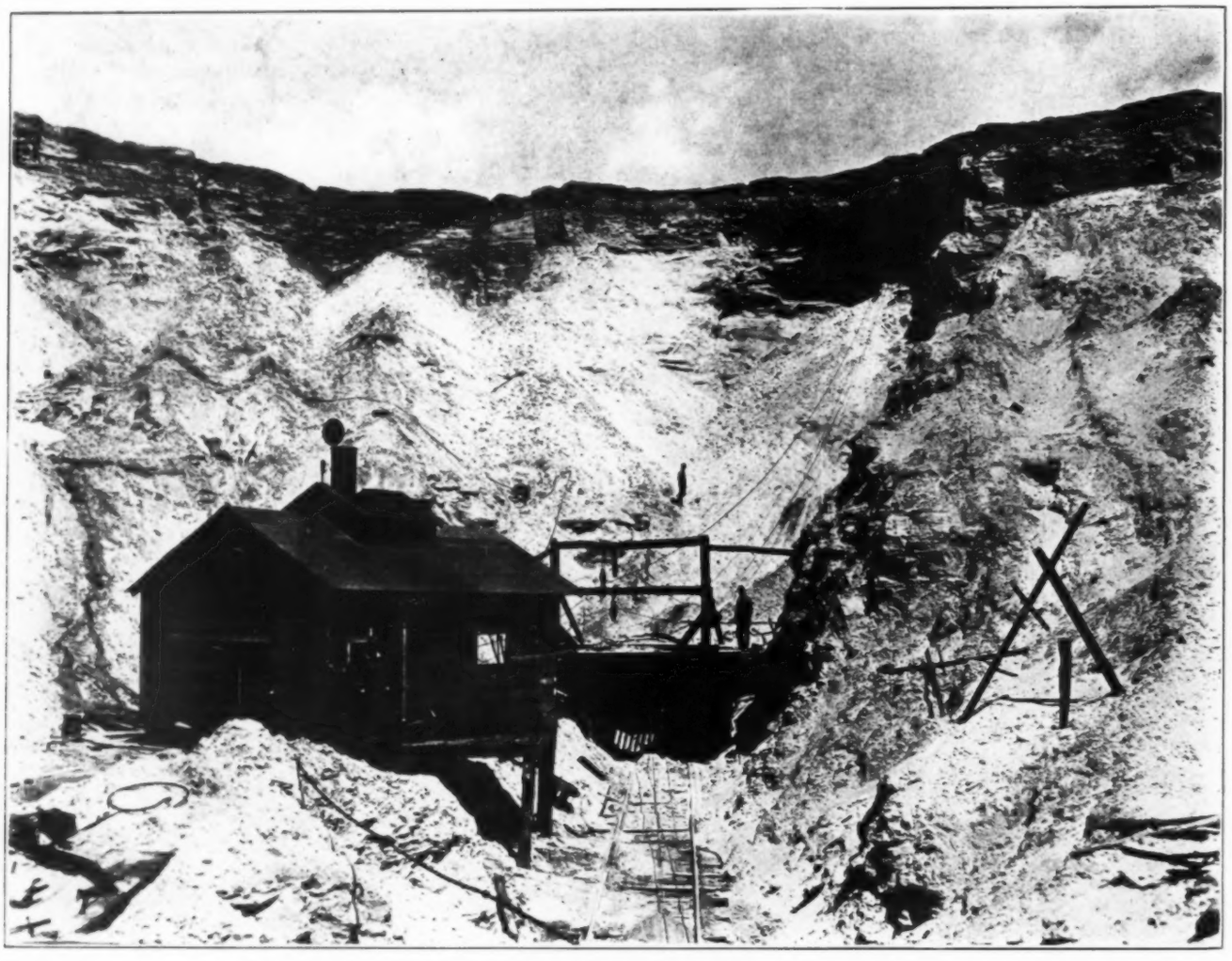
ONE of the largest producers of silica sand in the country is the E. J. Reynolds Sand Company of Utica, Ill. This company operates the oldest silica sand pit in the Illinois field and began work in 1887, when nothing but crude sand was produced. At present the company produces silica sand not only in crude form, but also washes and dries the sand. The capacity of the pit is forty cars per day and this material is shipped in five grades.



THREE-DRUM HOIST OPERATES BUCKET

The deposit in which the company is working is practically pure silica, as the sand contains 99.87 per cent of silica, with a small trace of other elements. It therefore can be used for any product where pure silica is required, such as glass, molding sand, etc.

The plant is operated by a dragline bucket of 1¾-cu. yd. capacity. This bucket is operated by a three-drum steam hoist and this hoist is shown in the upper photograph. The material is dumped from the bucket into small cars and it takes about two buckets to fill each car. The speed of the equipment is such that a car can be filled in a little less than one minute. It takes two minutes to remove a full car, empty it and bring it back.



GENERAL VIEW OF PIT SHOWING HOIST HOUSE AND BUCKET LINE

SPAIN BUILDS BIG AUTOMOBILE RACE TRACK

Structure at Sitges Near Barcelona Has Cement Surface and Is Designed for Great Speed

A GREAT autodrome, 1.24 mi. in length, with a concrete track, has been built in Spain at Sitges, which is about 42.23 mi. from Barcelona. The construction of this track was begun last year.

EXCAVATING ROCK FOR GREAT AUTODROME

The character of the site selected made it necessary to alter the type of pavement of the track at different places, depending upon the soil underneath. For about ⅛ mi. the track has been built upon solid rock, and in other places fills have been necessary.

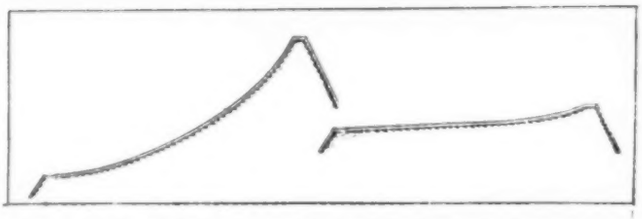
ONE OF THE FILLS WHICH FORM THE FOUNDATION OF SECTIONS OF THE TRACK

The two small photographs on this page show the excavation of the solid rock in progress at the left, and in the photograph at the right the fill may be seen.

Some sections of the track have been reinforced and others have been constructed without reinforcing, depending, of course, on the character of the subsoil. Expansion joints have been provided to take care of the changes in the pavement due to the temperature. The pavement is 4.7 in. in thickness.

AUTOMOBILE BEING DRIVEN AT TOP SPEED ON SITGES TRACK

The site at Sitges was selected because of its nearness to Barcelona and also because of the fact that the town is on the Mediterranean Sea and therefore possesses many natural advantages which will attract visitors to the races held on the track.



THE LEFT DIAGRAM SHOWS PROFILE OF TRACK ON CURVES. THAT AT RIGHT SHOWS PROFILE ON STRAIGHTAWAY SECTIONS

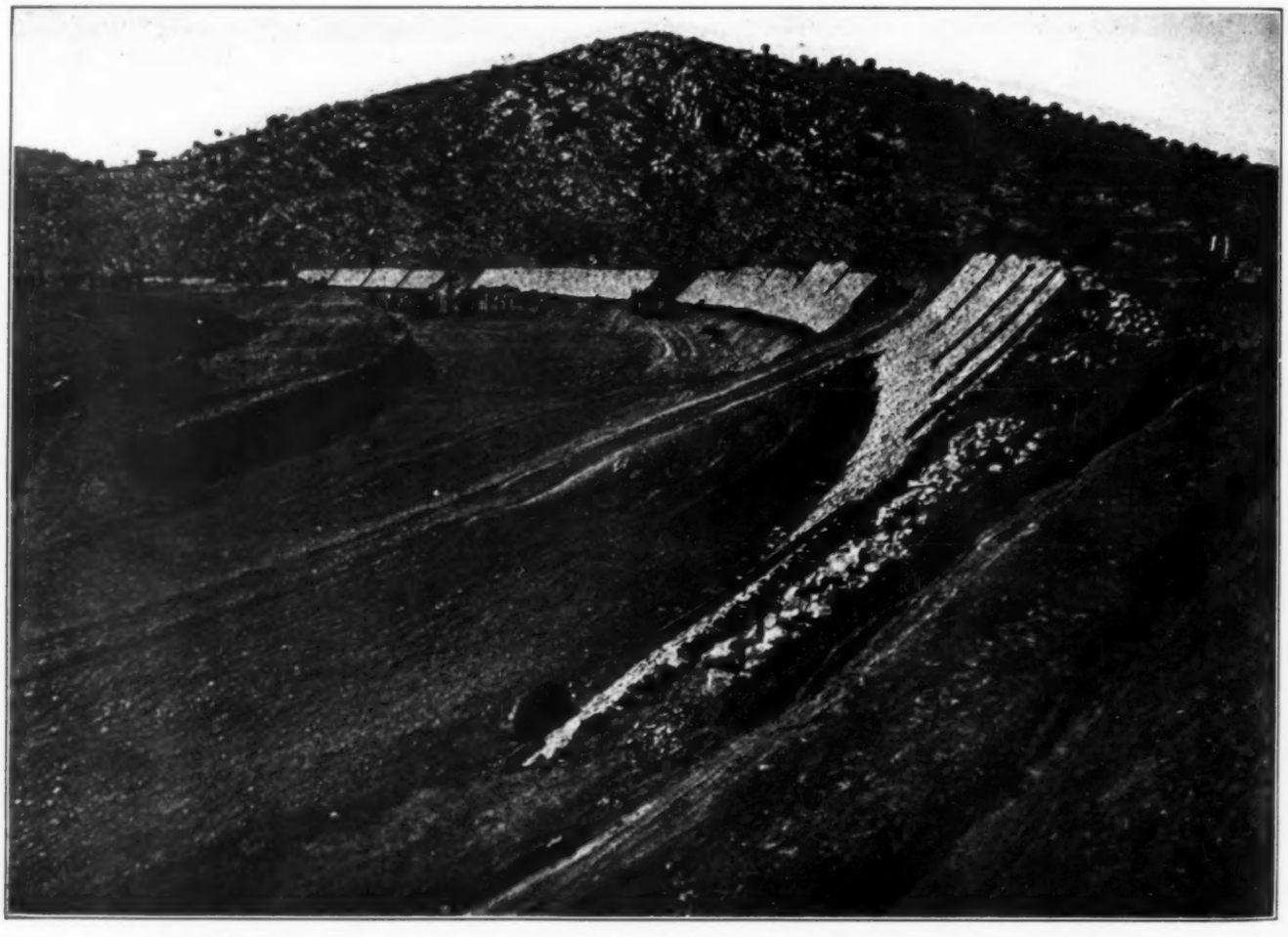
When the plans for the autodrome were being made, the designs of the leading automobile tracks in various parts of the world were studied carefully, and the length of 1.24 mi. was selected after a comparison of the results obtained on other courses. The inclination of the curves also was carefully planned, and the diagram at the top of page 18 shows how the track is banked on the curves and on the straightaway sections. This banking has been so arranged that the cars using the track may move at maximum average speed. The width of the track on the straight sections is 59.04 ft. and on the curves is 72.16 ft. At no point on the track will a car be more than 2/3 mi. from the work shops.

The topography of the site selected for the track made a contra-curve necessary at one point. The stands when the entire plan has been carried out will be composed of three sections, the official stand in the center and the grandstands at each side that will be so situated that they will overlook the entire track and will be about 1640 ft. in length.

The entire plan for the track was worked out by an organization of leading Spanish citizens interested in the promotion of automobile racing. The president is Don Juan Pich y Pon.

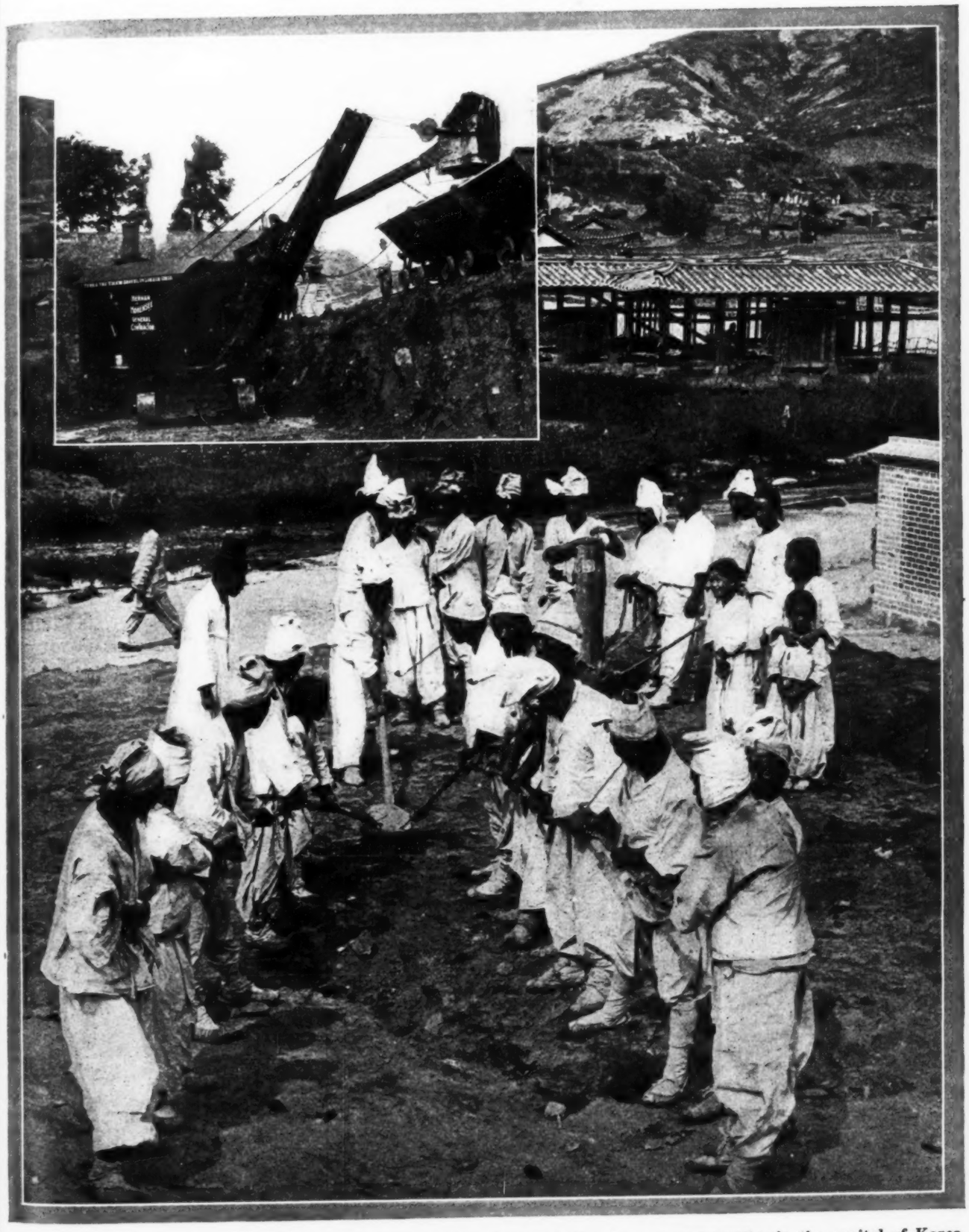
The promoters of this autodrome feel that its construction will aid in the great cause of good roads. At the present time the Spanish roads are not adequate for the traffic which they will be called upon to bear within the next few years. The number of automobiles in Spain is bound to increase rapidly, and Señor Pich y Pon and his colleagues insist that in building this autodrome, which they call the "Great Peninsular Autodrome," they will be increasing the knowledge of the requirements of motor-driven traffic. Barcelona, the city near which the track is built, has 1,140,000 inhabitants, and therefore will be well able to fill this autodrome whenever a good card is arranged.

Automobile racing on the other side of the Atlantic has experienced a revival since the war and now Spain has joined the procession.



GENERAL VIEW OF PART OF THE AUTODROME SHOWING CONSTRUCTION UNDER WAY

A Study in Shovels

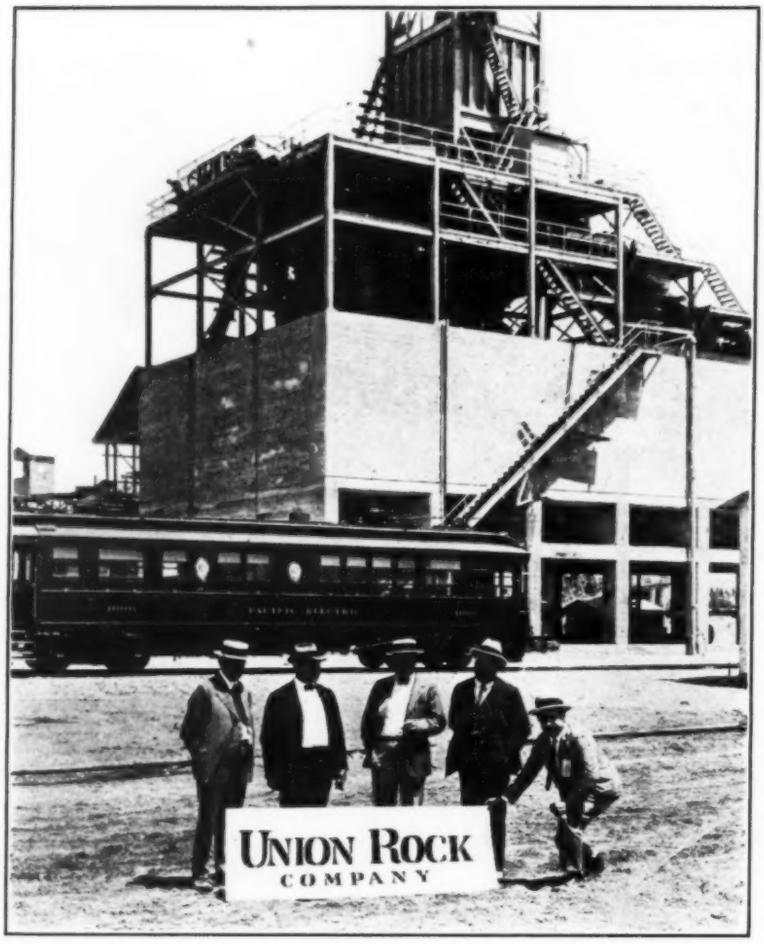


This photograph shows a man and boy power shovel digging the foundation for a new postoffice in the capital of Korea. At the left may be seen the foreman with his top hat. By way of comparison a photograph of a modern steam shovel is inserted. © *Underwood & Underwood.*

IT PAYS TO ADVERTISE

THE realization that it pays to advertise seems to be an attribute of construction men on the Pacific Coast which their brothers in other parts of the country would do well to cultivate. The photographs on this page show a new $500,000 rock, sand and gravel plant of the Union Rock Company of Los Angeles.

This plant, which is in Baldwin Park, was opened recently with a celebration and barbecue at which 1500 guests were present. Many of the guests came in cars and others arrived in a special train on the Pacific Electric Railway. Those present included many men prominent in the construction field in Los Angeles, and after eating a barbecue dinner, they inspected the new plant, which has a capacity of 500 tons per hour, and a bin storage of 5000 tons.



The officers of the Union Rock Company are: George A. Rogers, president; L. L. Rogers, vice-president; Harry Lee Martin, vice-president; R. E. Rogers, secretary; T. C. Rogers, treasurer, and Walter Moore, Jr., manager of sales department.

Among those who attended were: T. W. Williams, assistant general manager of Southern Pacific Lines; E. R. Werden, president of the Los Angeles Paving Company; T. B. Talbot, chairman of the Orange County

THE NEW PLANT OF THE UNION ROCK CO. OF LOS ANGELES. THE UPPER PHOTOGRAPH SHOWS FROM LEFT TO RIGHT: G. A. ROGERS, PRESIDENT; R. E. ROGERS, SECRETARY; L. L. ROGERS, VICE-PRESIDENT; T. C. ROGERS, TREASURER; AND WALTER MOORE, JR., MANAGER SALES DEPARTMENT

Board of Supervisors; J. H. McBride, Road Commissioner of Orange County; W. P. Jeffries, president of Angeles Mesa Land Company; R. F. McClellan, chairman of Los Angeles County Board of Supervisors; also Henry Wright and J. H. Bean, members of the Los Angeles County Board; Jerry Kelliher, land department of Los Angeles County flood control; D. W. Pontius, vice-president and general manager of the Pacific Electric Railway Company; Harry Lee Martin, vice-president and general manager of Mortgage Guarantee Company, and T. J. Day, traffic manager of Pacific Electric Railway Company, and Ed. J. Delorey, Board of Public Works, city of Los Angeles.

A few speeches, appropriate to the occasion, were made, among the speakers being: D. W. Pontius, W. P. Jeffries, R. F. McClellan and Harry Lee Martin. George A. Rogers, president of the Union Rock Company, responded, on behalf of the company, with a short talk.

HELPING IN AN EMERGENCY

Construction Equipment Removes Debris of State Theater After Lorain Tornado

THE photograph at the bottom of this page shows three different types of construction equipment engaged on emergency work of an unusual character. A steam shovel and two gasoline cranes, one large and one small, are shown removing the debris of the State Theater at Lorain, Ohio, after it had been wrecked by the tornado which caused so much destruction in that city on June 29.

These three units were rushed to the State Theater, where the greatest loss of life occurred, and at once set to work picking up the wreckage. The shovel at the left of the photograph is standing on the original location of the theater stage and the tangled mass of material in the rear is the balconies and the other debris which covered up the main auditorium.

These three pieces of equipment were on the job just as soon as they could get to the scene and their services were volunteered by their owners.

SHOVEL AND TWO CRANES REMOVING DEBRIS ON SITE OF THEATER WRECKED BY TORNADO AT LORAIN

Unfortunately the work on the theater was not the only emergency job which these machines had to do. The two small photographs show a crane mounted on a motor truck doing odd jobs in the wrecked portion of Lorain. As about 650 homes were totally destroyed, the cleaning-up process was no easy job. The photograph on the left shows the crane cleaning away the wreck of a house. It accomplished this job without difficulty.

The photograph on the right shows a crane handling

CRANE MOVING WRECKED HOUSE

PULLING MOTOR CARS OUT OF LAKE ERIE

automobiles which had been parked at the municipal beach and blown into Lake Erie. A lifeguard went out and fastened a line to the wrecked cars and the crane pulled them ashore, including dragging them over the 8-ft. concrete seawall and up a 40-ft. bank. One car was blown into four separate pieces.

Much of this work was done under the direction of the 112th Engineers, U. S. A., and National Guard units. Sightseers who managed to work their way past the guard were immediately put to work.

DEVELOPING A CONSTRUCTION ORGANIZATION

AN interesting comment on an editorial which appeared in the June issue of SUCCESSFUL METHODS has been received from N. F. Helmers, member of the firm of Siems, Helmers & Schaffner, well-known contractors of St. Paul, Minn. The letter follows:

The Editor of SUCCESSFUL METHODS:

DEAR SIR: I read with interest the editorial in your June issue, relative to a dearth of good foremen. As a member of the construction fraternity who handles a great deal of work each year I want to take a definite issue with some of the statements in your article. There is a shortage of foremen for the contractor who thinks he can pick them out of thin air, or who thinks he can obtain such men through employment agencies or by advertising.

There is no shortage for the constructive concern that continually builds its organization. Any contractor worthy of the name is watching his organization, picking out the likely men and pushing them along where possible, seeing that they get new experience in different lines, and giving them encouragement. Our concern specializes in difficult construction work, hydro-electric installations, etc., and we have found that we cannot hire men from the outside to put in responsible positions and have our work handled successfully. Our only safe method of procedure is to make our own general foremen and superintendents.

It is my personal belief that the men who are complaining are trying to get something for nothing. The same arguments, to some degree, applies to the present shortage of skilled labor.

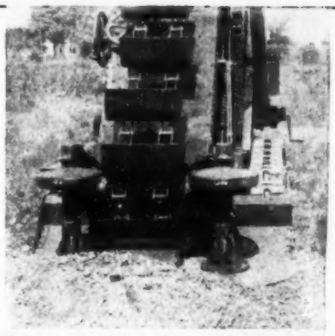
Very truly yours,

N. F. HELMERS.

PATCHING A CONCRETE PAVEMENT WITH CONCRETE

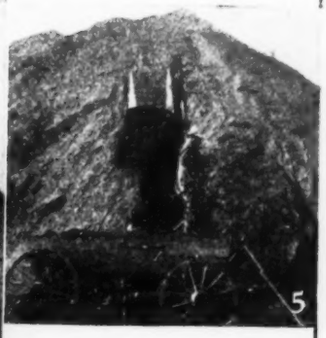
INDIANA is trying the experiment of patching a concrete road with concrete. This road is between Indianapolis and Oaklandon and was built during the war by Marion County. It was subjected to very heavy traffic during the war period and the holes were too numerous to patch with tar or asphalt. The State Highway Department decided to use cement and the results of this experiment will be carefully watched.

1—Barber-Greenes on a state job where materials were stored in advance. Illinois urges advance storage as the most practical way to keep a job running steadily.



2—Showing the patented disc feeder. It is positive enough to feed the buckets in any material, but capable of slipping any overload. It abolishes the shovel clean-up.

3—Working in stone, a single Barber-Greene and one man made 376 loads in one day, for the Warren Company. Each load was 18 cubic feet.



4—The R. F. Conway Company's figures since 1920 prove the economy of Barber-Greenes and the advance storage of materials. Since the first purchase of 4 Barber-Greenes, 6 more were added as the number of jobs increased.

5—Keeping 75 teams on the move with a Barber-Greene. It loaded 1¼ yards in 40 to 45 seconds, and replaced 20 shovelers for the Madison County Commissioners, in Indiana.

Doing a Steam Shovel's Work at 50% Less Cost

When S. J. Peterson had a stretch of road to gravel in Scott County, Minnesota, he replaced his steam shovel with a Barber-Greene Bucket Loader, putting the loader to work at a 20-foot gravel bank.

In 21 days it loaded 6,406 cubic yards, keeping 9 to 11 trucks running over a 3½ to 5-mile haul. According to Mr. Scott, the foreman on the job, the Barber-Greene brought about a 50% saving over the steam shovel's operating costs.

Day in and day out, it maintained its swift loading pace, averaging 305 yards a day.

It is this swiftness, among other features, which has placed the Barber-Greene in an outstanding position in the material-handling field.

Whether it is handling sand, gravel, stone, or scarified road materials, its disc feeder digs straight into a pile, feeding positively to the buckets.

It is this method of loading that road contractors and pit and quarry men all over the country are adopting as the swiftest, most economical and dependable means of maintaining a constant flow of materials.

This is illustrated in the case of Wm. H. Ryan of Jackson, Michigan. Before he bought a Barber-Greene, the stone handling had slowed up the entire job. The loader, replacing 12 shovelers, saving $60.00 a day in wages alone, quickly became the pacemaker, and enabled Ryan to finish the job without delay.

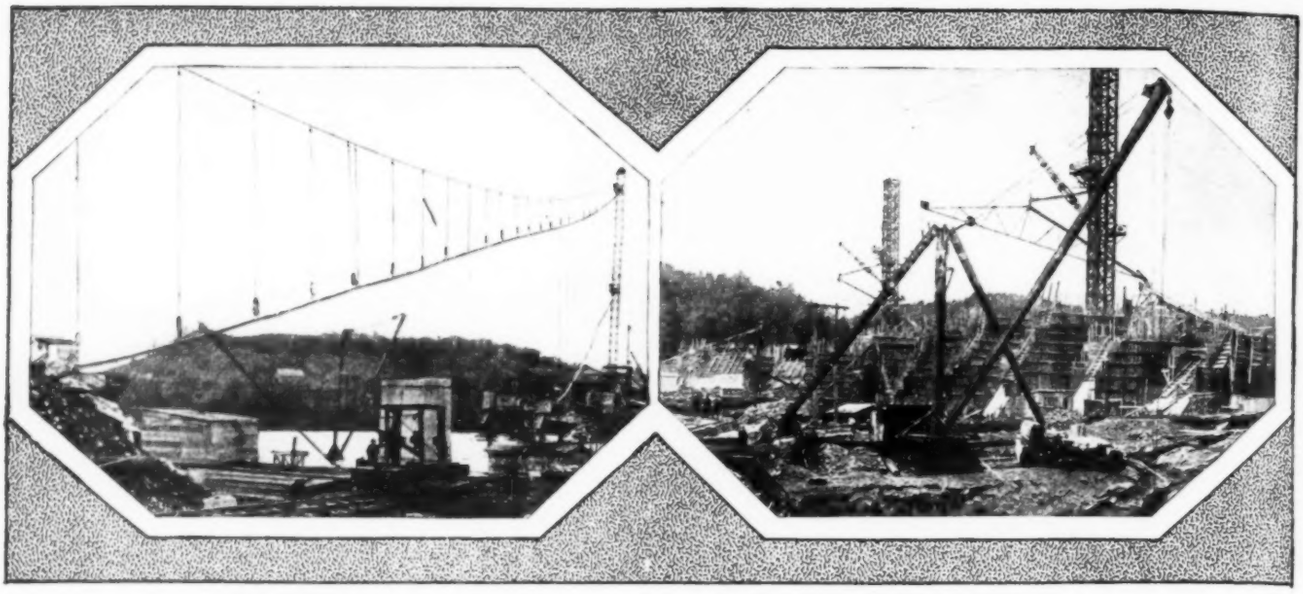
If you have not yet received a copy of "Results on Road Jobs," write us immediately. Its photographs and detailed descriptions of a large variety of road-building layouts, will give you many practical and valuable suggestions for your next road job. Send for it now.

BARBER-GREENE COMPANY—*Representatives in 50 cities*—530 W. Park Ave., Aurora, Illinois

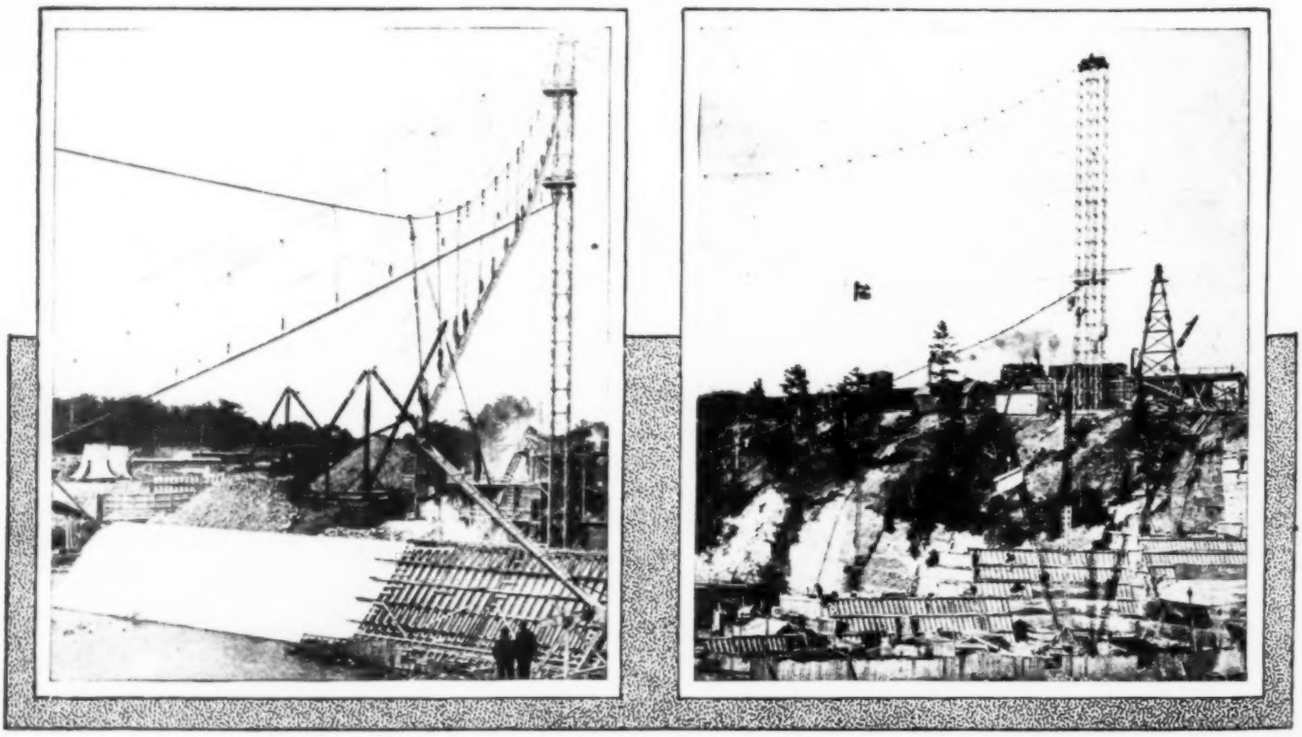
BARBER GREENE

Portable Belt Conveyors Self Feeding Bucket Loaders

Automatic Ditch Diggers



Installations such as these are continually demonstrating the greater capacity and longer life of Lakewood Chuting Equipment

Write for Bulletin 23-R. It gives complete information on Lakewood Chuting Equipment

THE LAKEWOOD ENGINEERING CO., CLEVELAND